

VIA FACSIMILE NO.: 571-273-8300  
Date: November 22, 2006

100717-597 (Bayer 10,260-WCG)  
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Andreas NICKEL, et al.  
Serial No. : 10/600,391  
Filed : June 20, 2003  
For : SEPARATION MODULE, METHOD FOR ITS PRODUCTION  
AND ITS USE  
Art Unit : 1743  
Examiner : Jyoti Nagpaul

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November 22, 2006

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

APPELLANTS' BRIEF ON APPEAL PURSUANT TO 37 CFR § 41.37

Sir:

This is an appeal from the final rejection of an Examiner of Art Unit 1743.

1. REAL PARTY IN INTEREST

The instant application is owned by Bayer Aktiengesellschaft and Hermsforfer

Inst. Für Technische Keramik e.V., record owners hereof.

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### 8. CONCLUSION

Wherefore it is submitted that the final rejection is in error and should be  
**REVERSED.**

### AUTHORIZATION TO CHARGE FILING FEE TO DEPOSIT ACCOUNT

Appellant is:

☐ a small entity

☒ other than a small entity

It is requested that the fee for the filing of the Brief on Appeal be charged to the undersigned's Deposit Account No. 14-1263.

Please charge:

☐ \$ 250.00 for small entity

☒ \$500.00 for other than small entity.

### CONDITIONAL PETITION FOR EXTENSION OF TIME

If any extension of time for this response is required, appellant requests that this be considered a petition therefor. Please charge the required Petition fee to Deposit Account No. 14-1263.

### ADDITIONAL FEE

Please charge any insufficiency of fees, or credit any excess to our Deposit Account No. 14-1263.

Respectfully submitted,

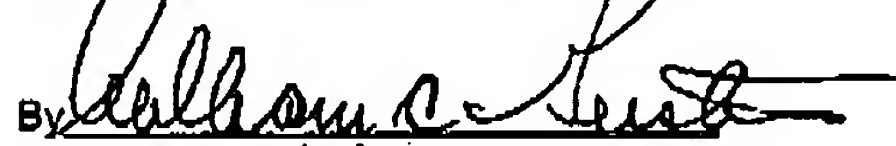
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## 2. RELATED APPEALS AND INTERFERENCES

The undersigned is not aware of any appeals, interferences, reexaminations, infringement actions or the like in any related applications.

## 3. STATUS OF CLAIMS

The claims pending in this application are claims 1,2 and 4-26. Although the Advisory Action(s) indicate that no claims have been withdrawn from consideration, it is believed that claims 17-25 remain withdrawn from consideration as drawn to non-elected subject matter (see Final Office Action of 5/25/06). The claims believed to be under consideration are therefore claims 1, 2, 4-16 and 26. All of said claims are finally rejected and all of said claims are on appeal.

## 4. STATUS OF AMENDMENTS

The last amendment filed was a Rule 116 Amendment filed April 16, 2005 (by facsimile) and that amendment was entered (see Advisory Action of September 7, 2006). A response to the Advisory Action of September 7, 2006 was filed on September 18, 2006, but that response did not include any claim amendments.

## 5. SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent claim 1 relates to a novel separation module comprising at least one bundle of ceramic capillaries (page 5, lines 28-30) having external diameters of from 0.3-10 mm and internal diameters of 0.1-8 mm (original claim 3) wherein a distance is established between capillaries by joining (page 5, line 30).

Independent claim 16 relates to a membrane reactor comprising the separation module of claim 1, wherein the individual capillaries are coated with a catalyst or are themselves a catalyst or a catalyst is otherwise present in the module (original claim 16).

Independent claim 26 relates to a membrane separation process, using the separation module of claim 1 with a vacuum being applied to the permeate space (original claim 26).

#### 6. GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

The grounds for rejection to be reviewed on appeal are

A) The rejection of claims 1, 2, 7, 11-16 and 26 under 35 USC 102(b) as anticipated by Bellhouse (US 6,217,764)

B) The rejection claims 3-6 (now 4-6) and 8-9 under 35 U.S.C. 103(a) as obvious over Bellhouse (US 6,217,764).

## **7. ARGUMENTS**

**A) The rejection of claims 1,2, 7, 11-16 and 26 under 35 USC 102(b) as anticipated by Bellhouse (US 6,217,764)**

Claims 1, 2, 7, 11-16 and 26 , but not claim 3 , were rejected under 35 U.S.C. 102(b) as anticipated by Bellhouse (U.S. 6,217,764). Claim 3 clearly was not included in this rejection. In their amendment of August 24, 2006, Appellants added the limitations of claim 3 to claim 1. Claim 1 was therefore made an independent form of claim 3, which clearly obviated the rejection as to claim 1. Since all remaining claims are dependent from claim 1 (i.e., from the independent form of claim 3), they too are believed to be free of this rejection.

In the Advisory Action of September 7, 2006, the Examiner does not indicate that the anticipation rejection was withdrawn, as it should have been, but in the continuation of box 13, the Examiner refers to the obviousness rejection of claims 3-6 and 8-9. The Examiner does not say that the anticipation rejection is withdrawn, and she does not say that it is maintained. From the context of the Advisory Action, and in view of Appellants' amendment, it is believed that the Examiner intended to withdraw the anticipation rejection.

Nevertheless, to the extent that the anticipation rejection has not been specifically withdrawn, it should be reversed for at least the reasons given above.

Furthermore, Appellants' capillaries are individual tubes, having structures which are defined by their internal and external diameters; the difference between the two being a defined wall thickness. The tubes, although grouped together in bundles, are free-standing tubes. One could, for example, separate the bundle into individual tubes and hold a tube in the hand. Appellant's tubes are individual discrete structures.

Bellhouse, by contrast, discloses a porous block which has open passageways passing through it.

Bellhouse has a porous block with ducts running through it. There are no ceramic capillaries taught or suggested by Bellhouse at all, and certainly no bundle of capillaries which have a distance between them established by joining.

What the Examiner refers to as "capillaries" in the Bellhouse reference are not capillaries, they are ducts. The ducts are formed by setting up a group of rods, introducing a clay, glass or other ceramic or porous material into the space between them, heating the material to "fire the clay", and removing the rods. The result is a block with holes (ducts) through it. (Col. 3, lines 50-63).

What the Examiner refers to in the Office Action of May 25, 2006 as "plates (28)" does not exist. The number "28" in Bellhouse designates the clay that is poured around the steel rods, which are then removed. The resulting block essentially defines the ducts, but does not constitute a "plate" that holds individual ceramic capillaries

apart.

What the Examiner refers to as a "housing 24" does not exist. The number "24" designates a tubular metal container (col. 3, line 51) for the metal rods mentioned above (i.e., not capillaries). When the fired block of clay is cooled, the metal rods are withdrawn to leave the holes in the block, and the block is retracted from the metal container (col. 3, line 61).

The end result is a block of clay with holes in it; there is no housing and there are no capillaries!

Note that the technique invented by Bellhouse of using a helical shape could not be used with capillaries (col. 1, paragraph beginning at line 46). Bellhouse thereby teaches away from capillaries.

Figure 7 referred to by the Examiner does not show any capillaries or even ducts. Figure 7 illustrates Bellhouse's process, wherein rods 26 (col. 3, line 52) are surrounded by clay 28 (col. 3, line 55); all within a metal container 24 (col. 3, line 51). As discussed above, the rods are later removed from the clay; and the dried clay is removed from the metal container.

The Bellhouse reference cannot possibly be seen as anticipating Appellants capillary tube bundle.



The rejection of claims 1, 2, 7, 11-16 and 26 under 35 U.S.C. 102(b) as anticipated by Bellhouse (U.S. 6,217,764) should therefore now be **REVERSED**.

**B) The rejection of claims 3-6 (now 4-6) and 8-9 under 35 U.S.C. 103(a) as obvious over Bellhouse (US 6,217,764).**

Appellants' capillaries are individual tubes, having structures which are defined by their internal and external diameters; the difference between the two being a defined wall thickness.

There is no way that the ducts of the Bellhouse reference could be modified to arrive at Appellants capillaries. How can you "modify" an external diameter to a specific measurement when no external diameter exists in the first place? No one can modify something that does not exist!

In response to Appellants having pointed out to the Examiner that their capillaries are individual tubes, having structures which are defined by their internal and external diameters and that Bellhouse's ducts are essentially holes passing through a porous block of support material, the Examiner pointed to the language at col. 3, lines 55-64 of the Bellhouse reference. According to the Examiner this language makes it clear that the "rods/capillaries (26)" of Bellhouse have an external diameter and

particulate clay is used to fill the spaces between the rods (26).

Those skilled in the art would never mistake a rod for a capillary, however.

The language the Examiner cites should be read in context. Appellants therefore reproduce the language from col. 3, lines 50-63 below:

In this process, and with reference to FIG. 7, a tubular metal container 24 has the required number of duct defining rods 26 fixed within it. The duct defining rods of the present invention have helical formations projecting therefrom and are screwed into the top and bottom end plates of the metal container. Particulate clay 28 in dry or slurry form or glass or other ceramic or polymeric material is introduced into the space between the duct defining rods 26. When filled, the container is heated in an oven to the temperature required to fire the clay or other porous material. When the fired block has cooled, the duct defining rods 26 are unscrewed from the porous block and the block is retracted from the metal container. The duct defining rods 26 and/or the metal container 24 may be slightly tapered to improve release.

From this language, it is absolutely clear that Bellhouse first prepares a tubular metal container 24 with duct defining rods passing through it. Thus, the container 24 has rods 26 passing through it. The rods 26 are clearly solid rods, not hollow capillaries.

Then, Bellhouse introduces clay into the spaces surrounding the rods within the container, and fires the clay to solidify it. At this point, Bellhouse has a solid clay block, with solid rods passing through it.

Then, Bellhouse withdraws the rods from the solid block of clay, to leave behind a solid block of clay with ducts (i.e., the "holes" left behind when the rods are withdrawn) passing through it.

Such ducts are clearly not individual free-standing tubes, having structures which are defined by their internal and external diameters, such as Appellants' capillaries.

The Examiner contends that it would have been obvious to one of ordinary skill in the art to modify the system (of Bellhouse) such that the external and internal diameter ranges and the distance between the capillaries/rods would be as recited in claims 3-6 and 8-9 to achieve optimum filtration.

It is clear, however, that Bellhouse's ducts, being essentially holes through a solid block of clay, do not have external diameters in the same way as Appellants' capillaries do. The Examiner has not explained how external diameters, which do not exist in the first place, can be "optimized".

Clearly, no reading of the Bellhouse reference could possibly lead those skilled in the art to Appellants separation module comprising at least one capillary tube bundle.

The rejection of claims 3-6 and 8-9 under 35 U.S.C. 103 (a) as obvious over the Bellhouse reference is clearly without merit and should be REVERSED.

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## 9. CLAIMS APPENDIX

The claims are appeal read as follows:

- Claim 1. Separation module comprising at least one bundle of ceramic capillaries (9), said capillaries having external diameters in the range of from 0.3 mm to 10 mm, and internal diameters of from 0.1 mm to 8 mm wherein a distance is established between capillaries (9) by joining.
- Claim 2. Separation module according to claim 1, wherein said capillaries are combined at their endings by perforated plates and further comprising a housing, which encloses the bundle, the housing having an inlet and/or outlet pipe in fluid communication with the inside of the capillaries for a first material flow and/or an outlet pipe in fluid communication with the innerspace between the capillaries for a second material flow, wherein the distance between the capillaries is kept constant by spacers (6).
- Claim 4. Separation module according to Claim 3, wherein said external diameters range from 1 mm to 2.5 mm and said internal diameters range from 0.7 to 1.5 mm.
- Claim 5. Separation module according to Claim 1, wherein the distance between capillaries (9) and the capillary bundle is  $\leq 10$  mm.
- Claim 6. Separation module according to Claim 5, wherein said distance is  $< 3$ mm,
- Claim 7. Separation module according to Claim 1, wherein the distance between the capillaries (9) and the bundle is established as a function of the permeate flow and permeate medium.
- Claim 8. Separation module according Claim 1, wherein the capillary bundles have

a diameter of from 10 mm to 250 mm.

- Claim 9. Separation module according to Claim 8, wherein said diameter is from 20 mm to 50 mm.
- Claim 10. Separation module according to Claim 1, wherein the capillaries (9) have, on the inside, a thin membrane (M) having separation activity.
- Claim 11. Separation module according to Claim 1, wherein the capillaries (9) have, on the outside, a thin membrane (M) having separation activity.
- Claim 12. Separation module according to Claim 1, comprising built-in spacers as baffle plates (6) for controlling the flow in the space between the capillaries (9).
- Claim 13. Separation module according to Claim 1, wherein several bundles of capillaries are arranged parallel to each other in a housing and the separation module comprises a feed space and a permeation space.
- Claim 14. Separation module according to Claim 13, wherein the housing consists of stainless steel and a sealing of feed space and permeation space is effected by an elastomer O-ring, a graphite seal or a sealing compound.
- Claim 15. Separation module according to Claim 13, wherein the housing consists of ceramic and a sealing of feed space and permeation space is effected at joints by ceramic- or glass-containing slip, paste or adhesive.
- Claim 16. A membrane reactor comprising the separation module of Claim 1, wherein the individual capillaries are coated with a catalyst or are themselves a catalyst or the catalyst is otherwise present in the module.
- Claim 26. A membrane separation process, wherein a fluid to be separated is

passed through a separation module of Claim 1, having a feed space and a permeation space, and wherein a vacuum is applied to the permeate space (3).

**10. EVIDENCE APPENDIX**

No evidence under §§ 1.130, 1.131, or 1.132 has been submitted.

**11. RELATED PROCEEDINGS APPENDIX**

There have been no decisions rendered by a court or the Board in any proceeding identified pursuant to paragraph (c)(1)(ii) of 37 CFR 41.37